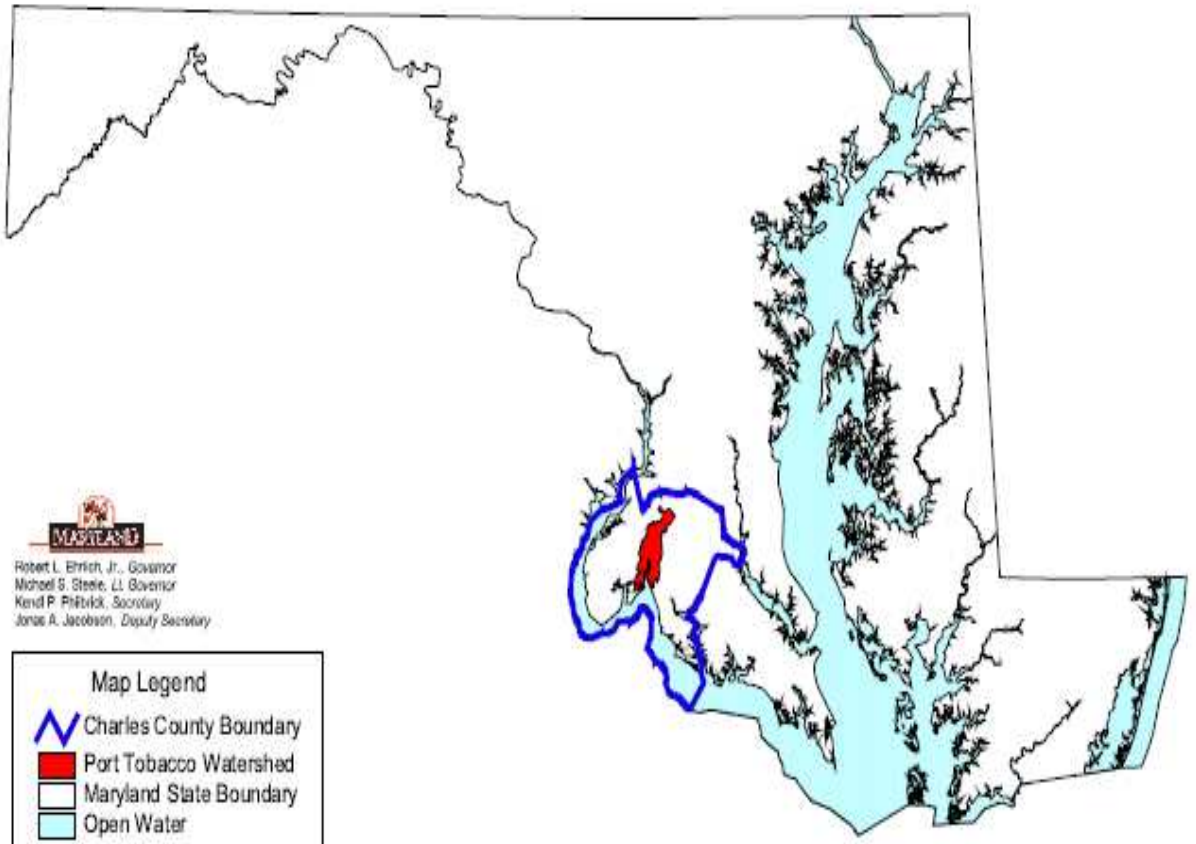
Port Tobacco River Conservancy

2016 Stream Monitoring Roundtable

Map 1: Port Tobacco Watershed WRAS Project Area
Charles County, Maryland



Robert L. Ehrlich, Jr., Governor
Michael S. Steele, Lt. Governor
Kendl P. Philbrick, Secretary
Jonas A. Jacobson, Deputy Secretary

Map Legend
- Charles County Boundary
- Port Tobacco Watershed
- Maryland State Boundary
- Open Water

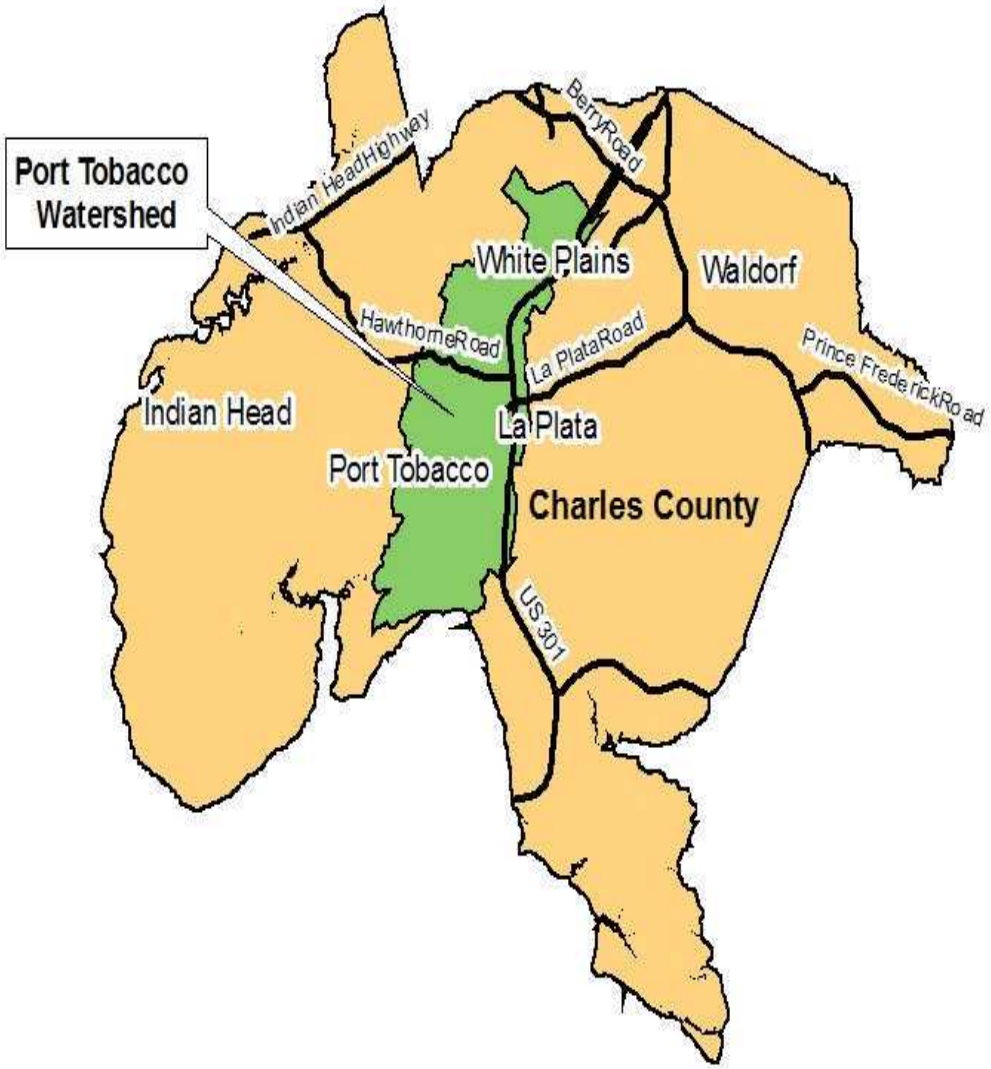
Map prepared by the Maryland Department of the Environment using data supplied by the Maryland Department of Natural Resources. The boundary layer is from the Maryland State Highway Administration. For more information contact TARSA at 410-537-3906. (KFE 2005)

N

0 25 50 Miles

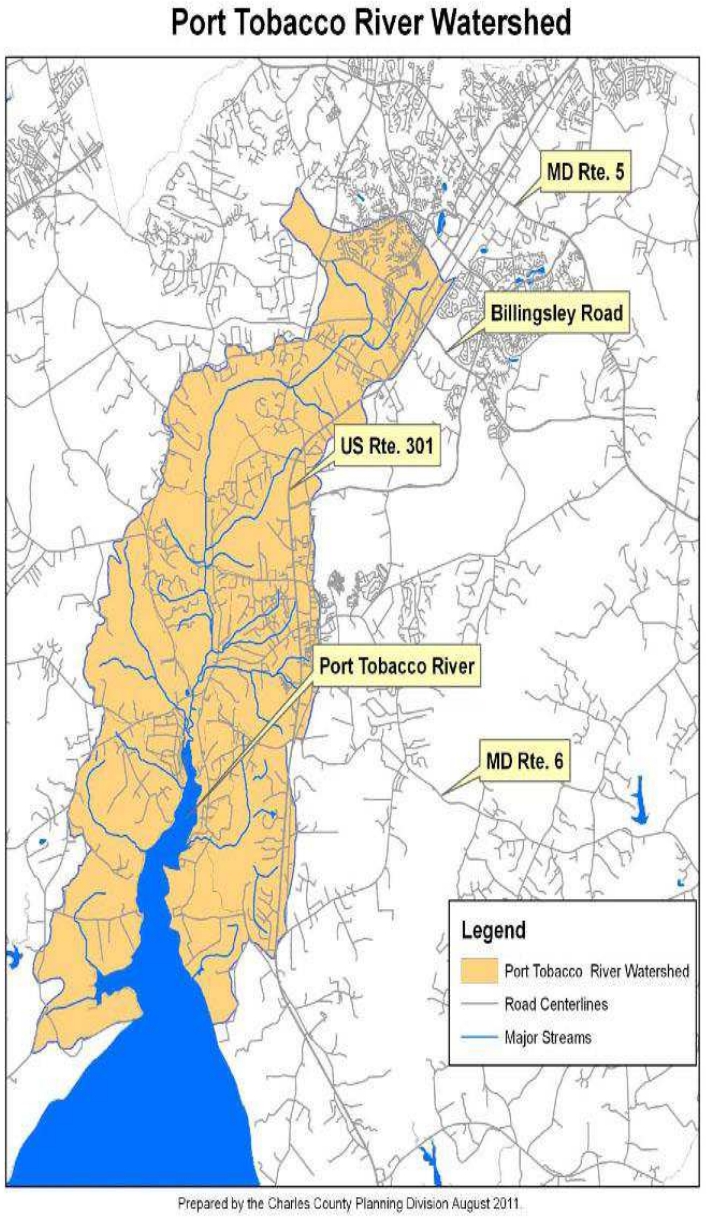
Scale: 1 to 700,000

Charles County



Port Tobacco River Watershed

- MD 8 digit watershed
- Total area -- 47 square miles
- Mapped perennial stream miles – 157
- 303(d) listed for bacteria, nutrients and sediment
- TMDL for nutrients (1999)
- Nutrient levels revised downward in Chesapeake Bay TMDL
- Charles County MS4 permit issued 2014
  - Watershed assessment completed in 2015
  - Implementation plan due June 2016



Port Tobacco River Conservancy

- Formed in October 2001 due to concern about local WWTP overflows.
- Began water monitoring in 2003 – regularly found entero values downstream of plant >2000 MPN.
- Worked with County to complete state-sponsored Watershed Restoration Action Strategy. Recommendations included:
  - Reduce bacteria below State limits for contact recreation
  - Reduce nutrient levels from non-point sources to prevent algal blooms
- Completed Surface and Groundwater Study with state and federal support, which identified failed septic systems as major source of contamination.

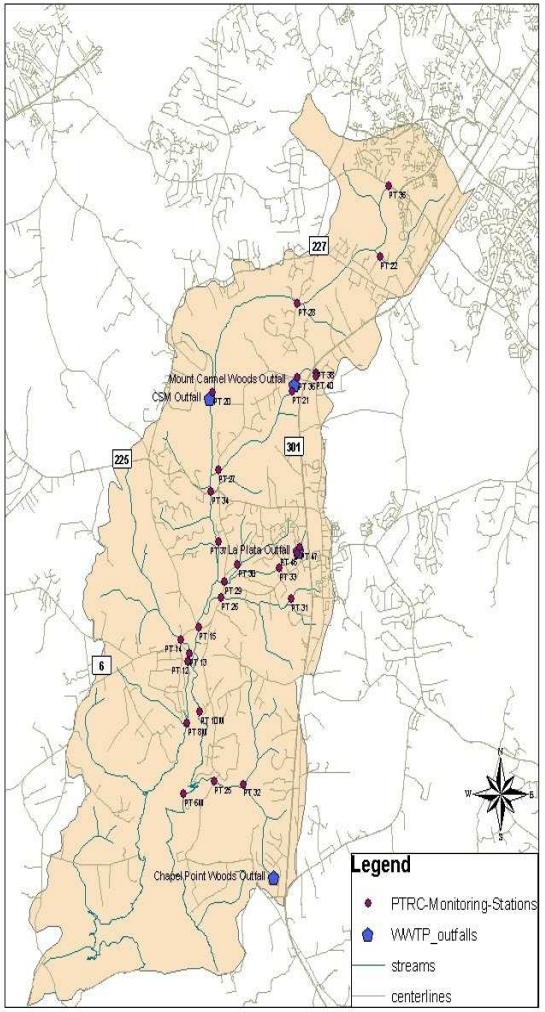
PTRC Monitoring Sites

In the spring of 2003, PTRC volunteers began collecting water samples from 40 locations in the Port Tobacco River watershed.

Sample analysis by the Charles County Department of Health revealed the presence of enterococci bacteria, in some cases at levels that posed a threat to public health.

PTRC believed that failing septic systems were causing the contamination, but more a more sophisticated study was needed to determine whether other sources, such as wastewater treatment plant outfalls, or wildlife or pet waste, could be the cause.

Port Tobacco River Conservancy, Inc. Monitoring Sites



This map prepared by the Charles County Planning Division using MD Property View. Monitoring stations from the Port Tobacco River Conservancy, Inc. Roads from Charles County files. Oct, 2006.

Watershed Restoration Action Strategy

- Charles County participated in the 2005 WRAS program.
- Purposes of the PT River WRAS:
  - Eliminate septic system failures
  - Eliminate sanitary sewer overflows
  - Protect a greater percentage of the watershed
  - Reduce runoff from new developments
  - Reduce stream bank erosion
  - Enforce erosion and sediment control
  - Eliminate illicit discharges
  - Educate residents on water quality
  - Exclude livestock from streams

WRAS subwatersheds

WRAS identified nine subwatersheds within the 8-digit watershed boundary based on:

- 12-digit boundaries
- Zoning
- Land use
- Size
- Tidal boundaries
- Development districts

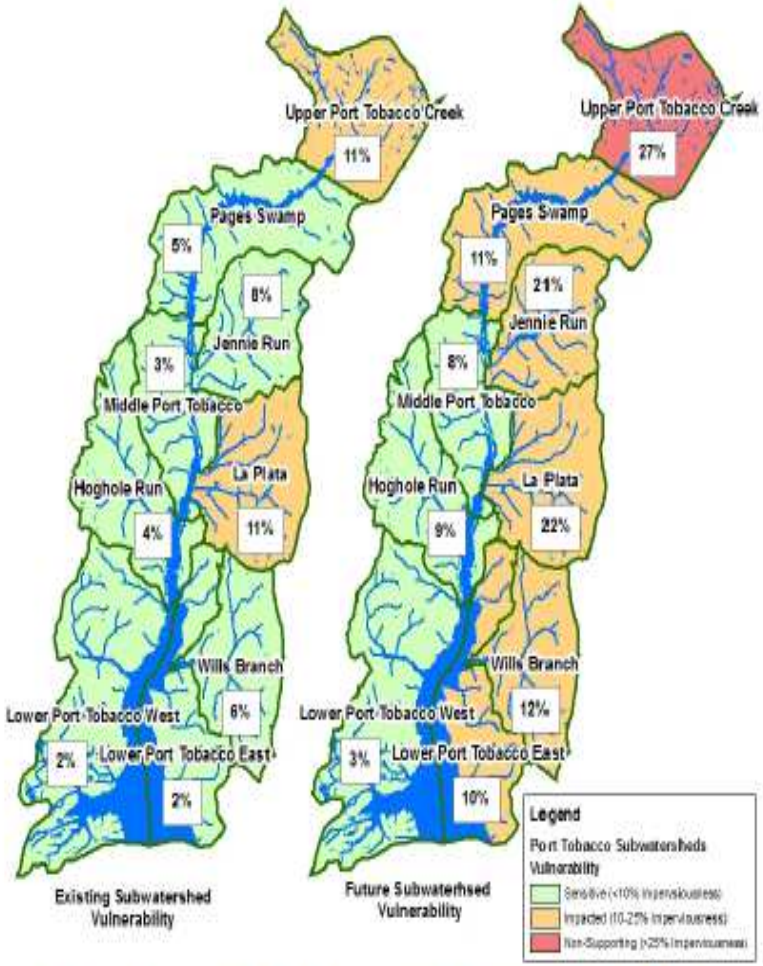


Figure 2-1. Subwatershed Imperious Cover for 2002 (Existing) and Future

Synoptic Survey Sampling Sites and Conclusions

Conclusions:

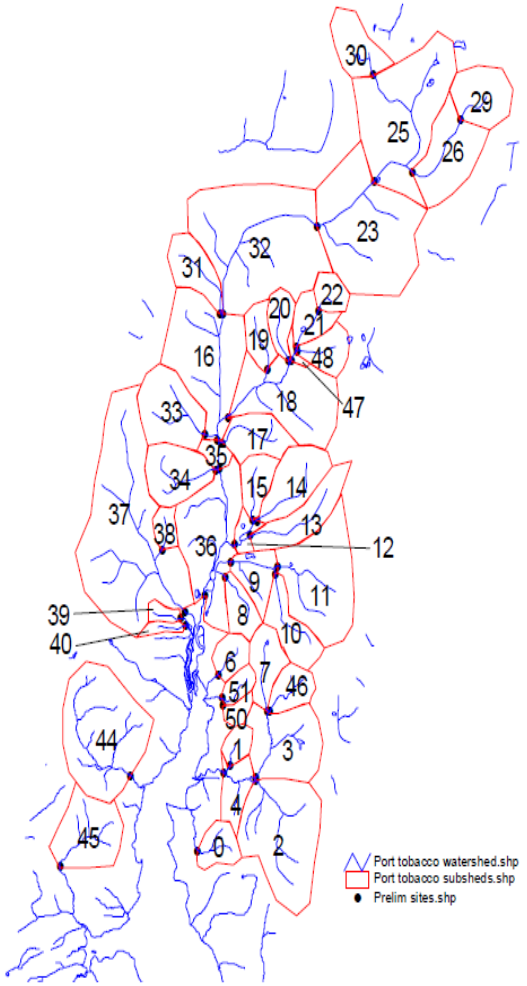
•No significant problem with dissolved nutrients.

•WWTP may be cause of locally moderately elevated orthophosphate yields, pH, specific conductivity and heavy algal growth.

•Moderately elevated nitrate/nitrite may be associated with communities on well and septic.

•Sampling for E.coli and optical brighteners was inconclusive in locating sources of bacterial contamination in 4 subwatersheds.

Figure 1. Port Tobacco WRAS Nutrient Synoptic Survey March, 2005
Nutrient Synoptic Sites and Subwatersheds



Surface and Ground Water Study

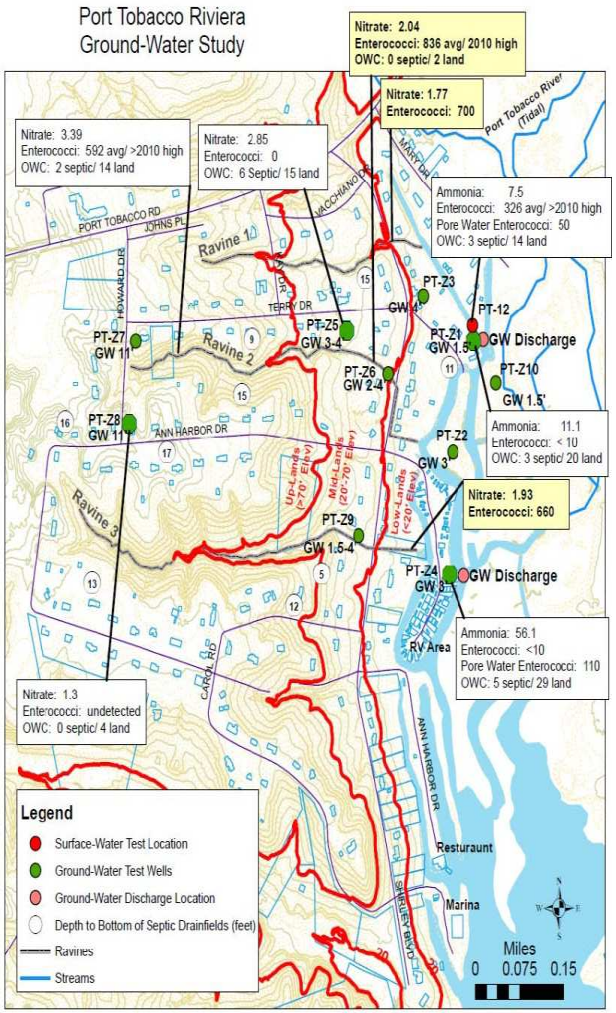
- In 2007, PTRC received a grant from the U.S. Environmental Protection Agency for surface-water and ground-water studies to identify sources of pollution and determine the most effective options for restoring the watershed to health.
- Study conducted in partnership with USGS to collect surface and pore water samples to identify source of bacteria.
- Indicates that failing septic systems are a major source of high levels of bacterial contamination in the Port Tobacco River.

Surface Water Study Results

USGS collected surface-water samples at 17 sites throughout the Port Tobacco River watershed and analyzed them for major ions, nutrients, organic wastewater compounds, and other selected constituents.

Porewater at several of these sites was also sampled and analyzed for inorganic constituents and organic wastewater compounds.

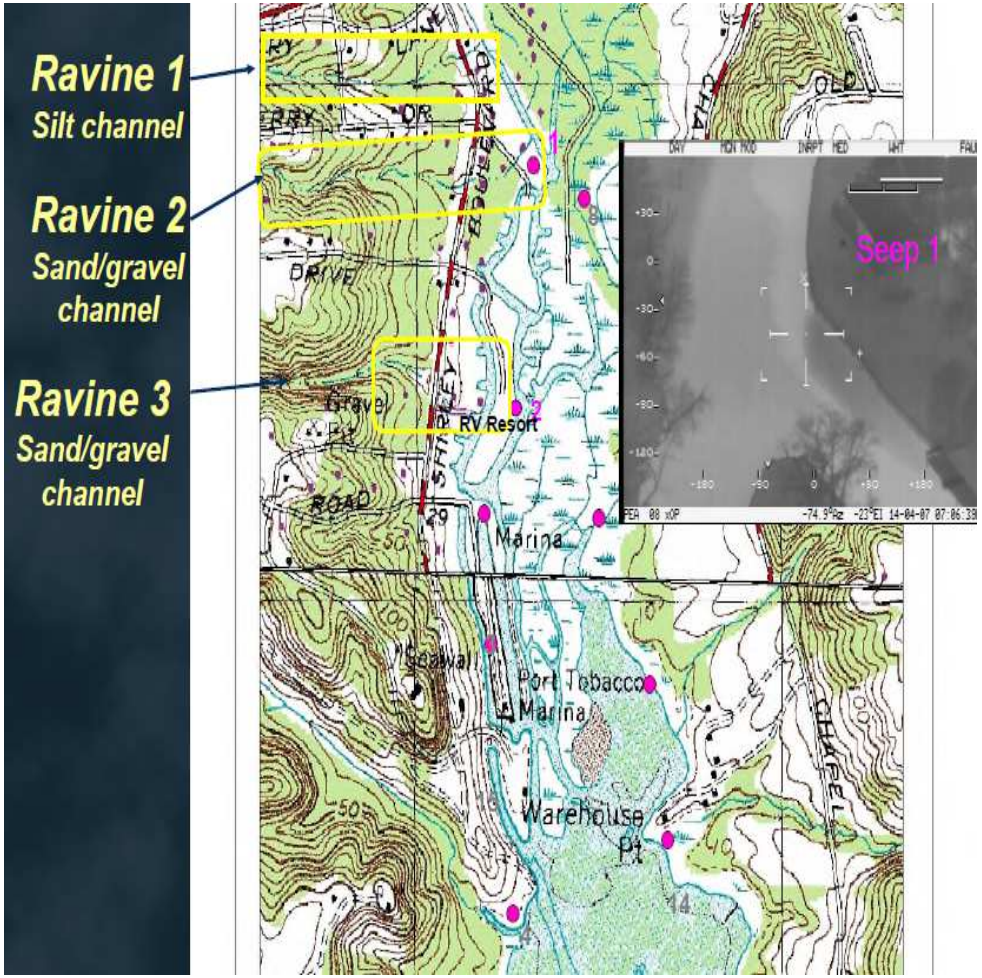
PTRC sampled for enterococci bacteria at each site. Four sites showed high levels of contaminants. At three of these sites, septic systems in adjacent residential communities were a major source of pollution. At the fourth, contaminants were traced to upstream horse and cattle farms.



Ground Water Study Results

USGS also installed groundwater sampling wells on properties in the Port Tobacco Riviera, and during drilling obtained soil sediment cores. The data from these soil cores show that the geology consists of high groundwater levels at all elevations ranging from the 180 foot hillside to the river.

Core data also measured a sand and gravel stratum extending from a few feet under the land surface down 25 feet to an impervious layer. The geology causes polluted wastewater in the septic drain fields to be flushed into ravines after rain events and then transported to the lowlands and the Port Tobacco River. The soils and geology found in the Riviera are similar to the entire Port Tobacco River watershed and are expected to be similar in all Charles County watersheds.



Stream Waders Monitoring 2003-2008

5 sampling years

100 samples

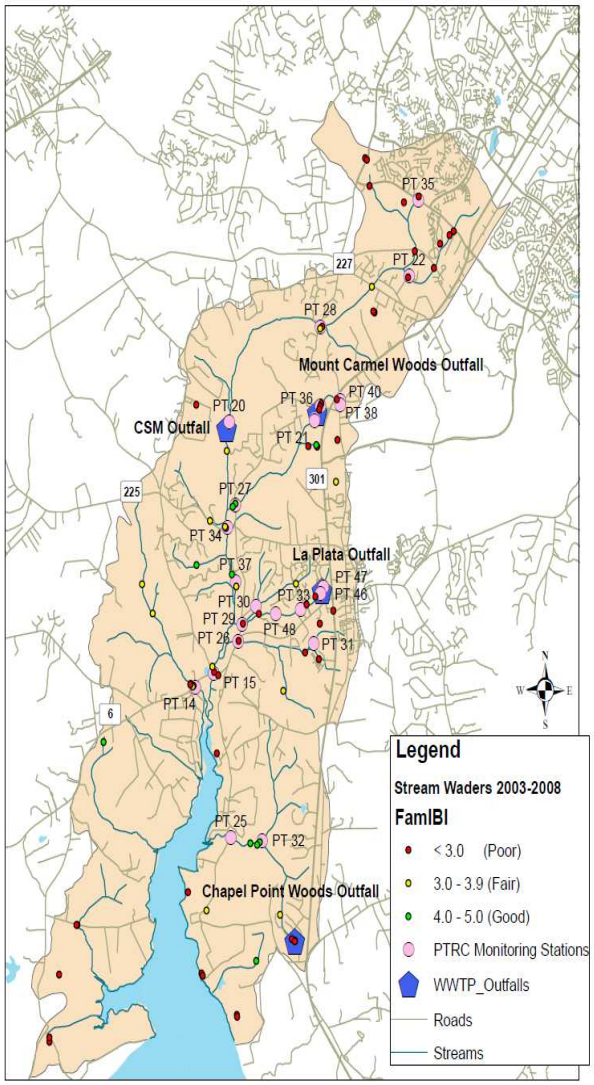
43 sites

Results range from 1.00 (very poor) to 5.00 (good)

3 sites sampled in 2015

Now taking training at Audubon Naturalist Society and considering feasibility of their program, which uses MBSS sampling methods and identification of organisms by trained volunteers.

Port Tobacco River Conservancy, Inc. Monitoring Sites



This map prepared by the Charles County Planning Division using MD Property View. Monitoring stations from the Port Tobacco River Conservancy, Inc. Roads from Charles County. March, 2010.

2015 Monitoring

12 sites sampled monthly June - August

•4 tidal

•8 non-tidal

Parameters measured with Hydrolab Quanta:

•DO mg/l

•Salinity

•Temperature

•Turbidity

Enterococci levels determined by Charles County Department of Health.

Shoreline Cleanups

Main site is Chapel Point State Park, only public access point to Port Tobacco River

Annual Potomac River Cleanup

Others as needed

2015 Port Tobacco River Watershed Assessment

- Required by County's NPDES MS4 permit.
- Supports County planning goals:
  - Complete implementation of restoration of 20 percent of County's impervious area.
  - Meet Chesapeake Bay TMDL stormwater load reduction targets.
  - Meet TMDL targets for local waterway impairments.
- WA intended to characterize current watershed and water quality conditions, identify and rank water quality problems, identify and prioritize water quality iprovement projects, estimate pollution reductions achievable with implementation

PT River Watershed Assessment 2015

- Upland Assessment
  - Neighborhood source assessment
  - Hotspot site assessment
- Nutrient Synoptic Survey
  - Stream discharge
  - Water quality
- Stream Corridor Assessment
- Potential Watershed Improvement Projects

Watershed Assessment Nutrient Synoptic Survey

Based on sites sampled in the WRAS

Samples collected at 36 sites. For most, water quality parameters fell within COMAR limits.

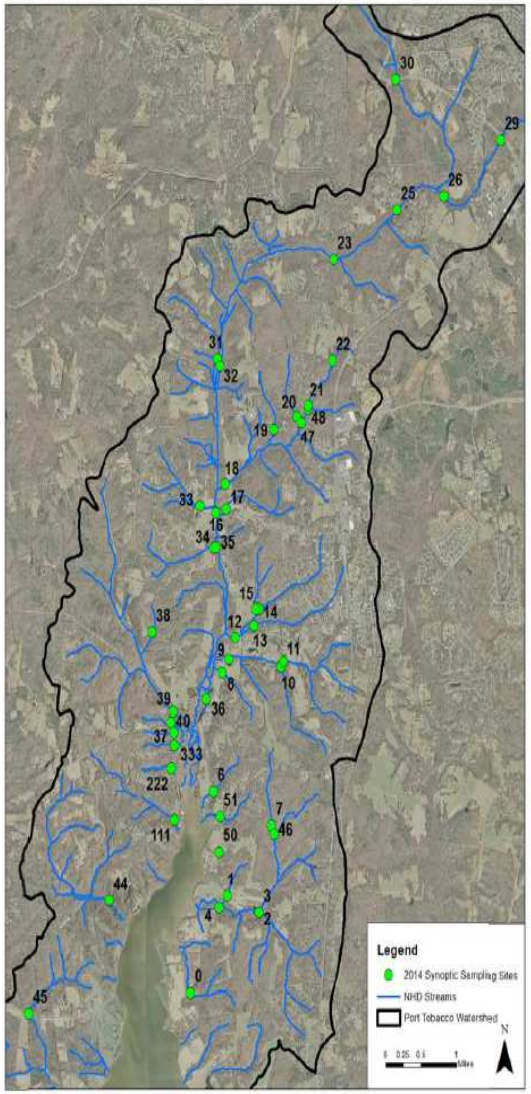
•6 sites had low DO levels; 22 had low pH

•Specific conductivity at 14 sites exceeded recommended values for benthic macroinvertebrates

•All were within acceptable ranges for temperature and turbidity.

•Elevated bacteria levels found near WWTPs or failing septic systems.

•Orthophosphate and total phosphorus concentrations generally elevated; few sites had excessive nitrogen concentrations



Sampling using MTAC non-tidal protocol

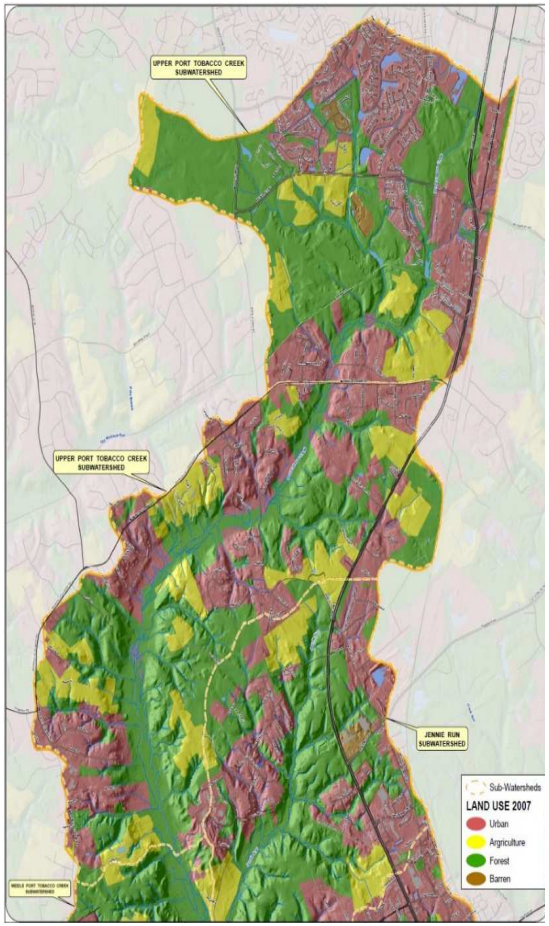
- Random sampling design and targeted sampling sites.
- Minimum once monthly sampling for a minimum total of 12 samples per year. Non-tidal indicators should be measured year-round.
- Four core water quality indicators: total nitrogen, total phosphorus, conductivity, and turbidity.
- Three diagnostic, or vital signs indicators: dissolved oxygen, pH, and temperature.
- Two core pollution indicators: bacteria and trash. Bacteria and trash are measured for an annual assessment.
- One core habitat indicator: benthic macroinvertebrates. This indicator is measured for a two-year comprehensive assessment.

Analysis and Communication of Sampling Results

MTAC protocol provides a scoring method that we hope can help us explain to the public and to decisionmakers what our data mean.

Figure 4.6. Descriptions of ecological health that correspond with each grade.

Focus on Headwaters



Upper Port Tobacco subwatershed

Pages Swamp subwatershed